



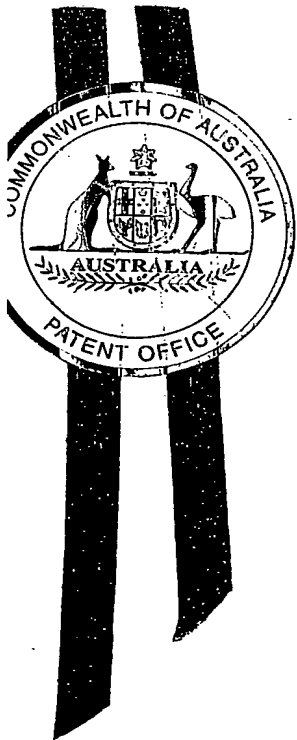
10/531970
PCT/AU03/01394
Rec'd ST/PTO 20 APR 2005

#2

REC'D 17 NOV 2003	
WIPO	PCT

Patent Office
Canberra

I, JANENE PEISKER, TEAM LEADER EXAMINATION SUPPORT AND SALES hereby certify that annexed is a true copy of the Provisional specification in connection with Application No. 2002952178 for a patent by BRETT JOHN CLAREBOROUGH as filed on 21 October 2002.



WITNESS my hand this
Seventh day of November 2003

JANENE PEISKER
TEAM LEADER EXAMINATION
SUPPORT AND SALES

PRIORITY DOCUMENT
SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH
RULE 17.1(a) OR (b)

Best Available Copy

AUSTRALIA

PATENTS ACT 1990

PROVISIONAL SPECIFICATION

FOR THE INVENTION ENTITLED:-

"Suspension Assembly"

The invention is described in the following statement:-

BSW Ref: 36927AUP00 KWB

"SUSPENSION ASSEMBLY"

Field of the Invention

The present invention relates to manually operated trolleys and the like. The invention is particularly well-suited to manual (non-motorised) golf buggies used to carry a player's golf bag around the course. For convenience, the invention will be described with particular reference to its application to manual golf buggies, however, it will be appreciated that this is purely illustrative and in no way restrictive on the application of the invention to other manually operated trolleys such as hand trucks, shopping carts and wheeled luggage.

10 Background of the Invention

It has long been known to use simple trolleys to manually transport relatively light loads over short distances. Manually drawn golf buggies are a typical example of this type of trolley. Golf buggies generally have a chassis with two wheels arranged so that it can cradle a golf bag and support itself in a stable, upright position. To move the buggy around the course, the chassis is rotated about the axis of the wheels so that the supporting section of the chassis lifts off the ground thus freeing the wheels to roll as it is drawn along behind the player.

Unfortunately, irregularities in the ground surface are translated directly to the golf buggy handle. This can make manoeuvring difficult or uncomfortable for the player. Ground irregularities will also cause the clubs in the golf bag to rattle against each other with potentially damaging impact. Such rattling also generates an appreciable level of ~~noise~~ which can be distracting and disruptive to other players on the course.

Summary of the Invention

It is an object of the present invention to overcome or ameliorate at least one of the disadvantages of the prior art, or to provide a useful alternative.

Accordingly, the present invention provides a suspension assembly for a manually operable trolley, the trolley having a chassis and wheels for travel across a

ground surface, the suspension assembly including a wheel mount for rotatably mounting at least one of the trolley wheels;

a chassis mount for mounting the assembly to the chassis; and

a suspension linkage extending between the chassis mount and the wheel mount;

5 wherein,

the suspension linkage is adapted to allow relative amendment between the wheel mount and the chassis mount in response to travel across irregularities in the ground surface.

In a preferred form, the wheel mount rotatably mounts only one of the wheels.

10 In a further preferred form, the suspension linkage has a resilient element for providing a biasing force that opposes any suspension travel of the wheel away from an equilibrium position. In these embodiments, it is advantageous if the biasing force is proportional to the suspension travel. Conveniently, the resilient element is a spring. However, ordinary workers in this field will readily appreciate that the resilient element may also
15 be a polymer or a rubber suspension hanger, a gas-filled bladder or even the elastic deformation of a generally horizontal strut cantilevered from the wheel mount. Likewise, some embodiments may also include a damping element to reduce oscillations about the equilibrium position.

In further preferred forms, the suspension link includes a hinged scissor link
20 with:

a wheel mount arm extending from the wheel mount;

a chassis mount arm extending from the chassis mount; such that

the wheel mount and chassis mount arms are hinged together; wherein

the spring is mounted to, and extends between the wheel mount and the chassis
25 mount arm for compression or extension in response to angular movement of the scissor link. In a particularly commercial embodiment, the trolley is a two-wheeled golf buggy.

According to another aspect, the present invention provides a manually operable trolley including:

a chassis with wheels for travel over a ground surface;

30 a suspension assembly for rotatably mounting at least one of the wheels and a chassis mount for mounting the assembly to the chassis; wherein

the suspension assembly is adapted for relative movement between the wheel mount and the chassis mount in response to travel over irregularities in the ground surface.

5 Preferably the trolley is a two-wheeled trolley wherein each of the wheels is mounted to the chassis via respective suspension assemblies. In a further preferred form, the trolley is a two-wheeled golf buggy.

10 Using the present invention, it is possible to provide manually pushed or drawn trolleys with a simple yet surprisingly effective suspension system. The simplicity of its design allows the system to be relatively inexpensive, aesthetically acceptable and easily incorporated into the manufacture of trolleys, or as an after market retro-fit. When used on trolleys such a golf buggies, the cushioned ride provided by the suspension significantly reduces the potentially damaging rattling of the clubs in the bag. The erratic or "jerky" movements of the buggy handle as it is drawn over rough ground is also substantially diminished. In turn, the ease and comfort of manoeuvring the buggy is enhanced.

15

Brief Description of the Drawings

Preferred embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings in which:

20 Fig. 1 shows a typical example of a manually drawn golf buggy together with a golf bag lifted from the bag cradle for clarity;

Fig. 2 is a front elevation of the suspension assembly according to the present invention;

Fig. 3 is a side elevation of the suspension assembly of Fig. 2; and

Fig. 4 is a perspective view of the suspension assembly shown in Figs. 2 and 3.

25 Detailed Description of the Preferred Embodiments

The golf buggy 1 shown in Fig. 1 is typical of most manually drawn golf buggies. The golf bag 2 is craddled in the buggy against a bag support 3 and cradle arms 4. The bag 2 is craddled so that its weight allows the buggy to stay upright and supported on the wheels 5 and 6 as well as the support 7. Often, a seat 8 is also provided for the comfort of the player.

30

In use, the player draws the buggy along using the handle 9. The length of the handle stem 10 is designed so that the chassis 11 of the buggy 1 rotates about the axis of the wheels to disengage the support 7 from the ground.

5 The wheels 5 and 6 are rigidly mounted to the chassis 11 and any shocks or vibrations caused by irregularities in the ground surface are transmitted directly to the golf bag 2 and the handle 9. This can shake the bag 2 and cause the clubs 12 to impact with each other and the interior of the bag. This is potentially damaging to the clubs and generates a significant level of noise.

10 The shock loading and vibrations caused by ground irregularities will also produce erratic and "jerky" forces on the handle 9. This can make the buggy 1 difficult and uncomfortable to use and manoeuvre. Incorporating the suspension assembly shown in Figs. 2, 3 and 4 provides the buggy 1 with a smoother operation that substantially reduces the vibration and impact problems discussed above.

15 Referring to Figs. 2, 3 and 4, the suspension assembly is shown in isolation from the chassis 11 and wheels 5 or 6. The assembly uses a scissor linkage with a chassis mount arm 13 connected to a wheel mount arm 14 via hinge arrangement 15 for relative angular movement. At the distal end of the wheel mount arm is a wheel mount sleeve 16 with an internal diameter sized to receive the stub axle of the wheels 5 or 6. Locking bolt 17 secures the stub axle within the sleeve 16.

20 Chassis mounting bar 18 is sized so that it can be received in the original wheel mounting sleeve of the chassis 11. End plate 19 connects the chassis mounting bar 18 to the chassis mount arm 13. Spigots 20 and 21 are welded to the chassis mount arm and wheel mount arms respectively. Compression spring 22 extends between the spigots. The internal diameter of the spring 22 is conveniently sized for engaging the spigots 20 and 21 with an interference fit.

25 The impact and vibration of the wheels when travelling over rough ground can be substantially absorbed and accommodated through the scissor action of the suspension assembly against the restoring force of the spring 22. The suspension travel cushions golf bag 2 and the handle 9 against the impact of irregularities in the ground giving the
30 buggy an appreciably smoother and quieter overall operation. This is not only beneficial

for the owner of the buggy, but also other players on the course that may otherwise be distracted by the noise from excessive club rattle.

5 The present invention has been described herein by way of example only.
Ordinary workers in this field will readily recognise many variations and modifications
which do not depart from the spirit and scope of the broad inventive concept. For
example, telescopically engaging sleeves surrounding the spring may be used instead of
the scissor linkage, polymer material or compressible gas may be used for the resilient
element and in more complex versions, a mechanical damper can be included for
damped suspension travel. The broad inventive concept may also encompass active
10 suspension whereby a transducer senses the vertical orientation of the buggy and feeds
or drains gas from air bag suspension on each wheel.

DATED this 21st day of October 2002

BRETT JOHN CLAREBOROUGH

15

Attorney: KENNETH W. BOLTON
Registered Patent and Trade Mark Attorney of Australia
of BALDWIN SHELSTON WATERS

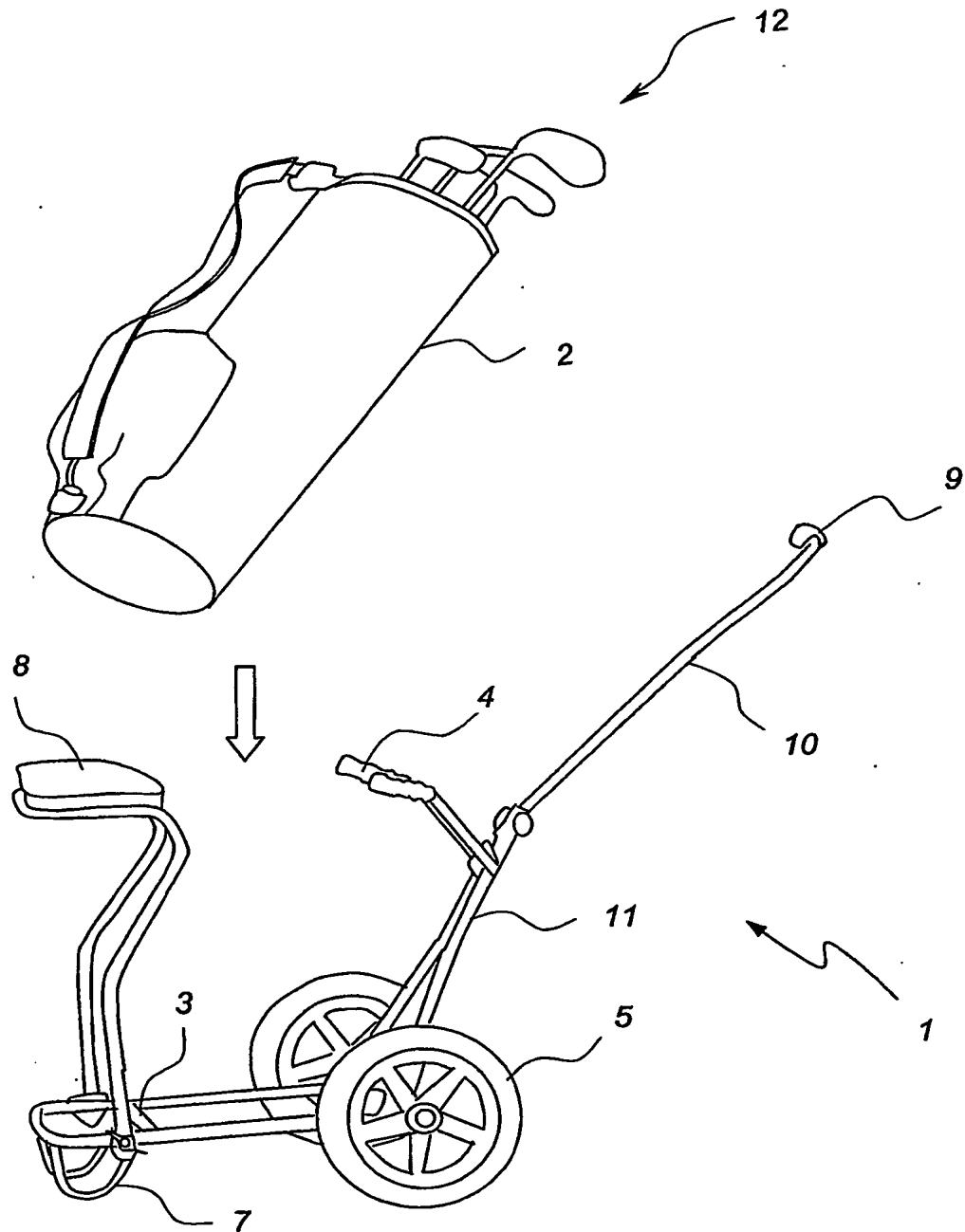


FIG. 1

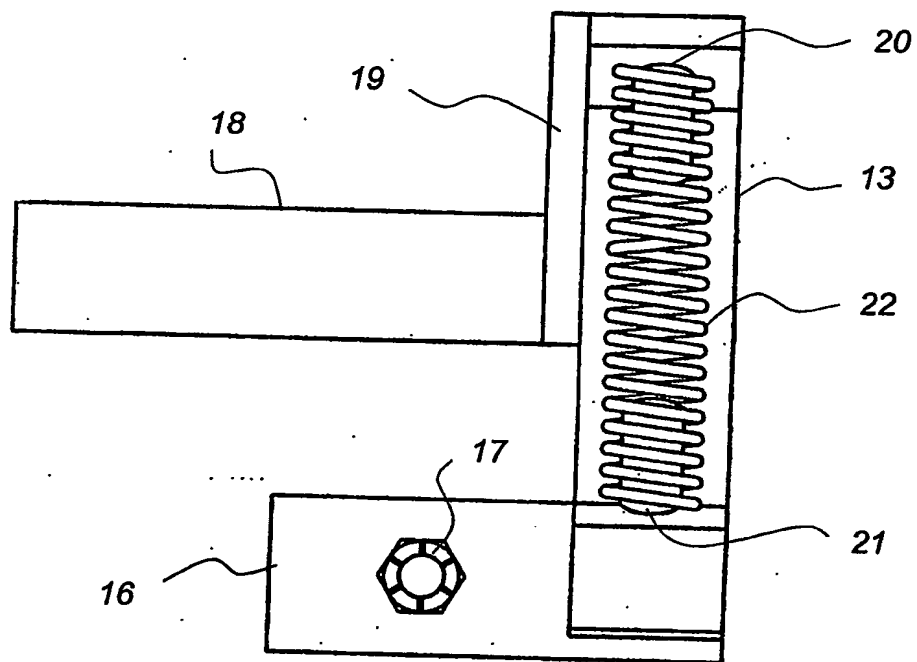


FIG. 2

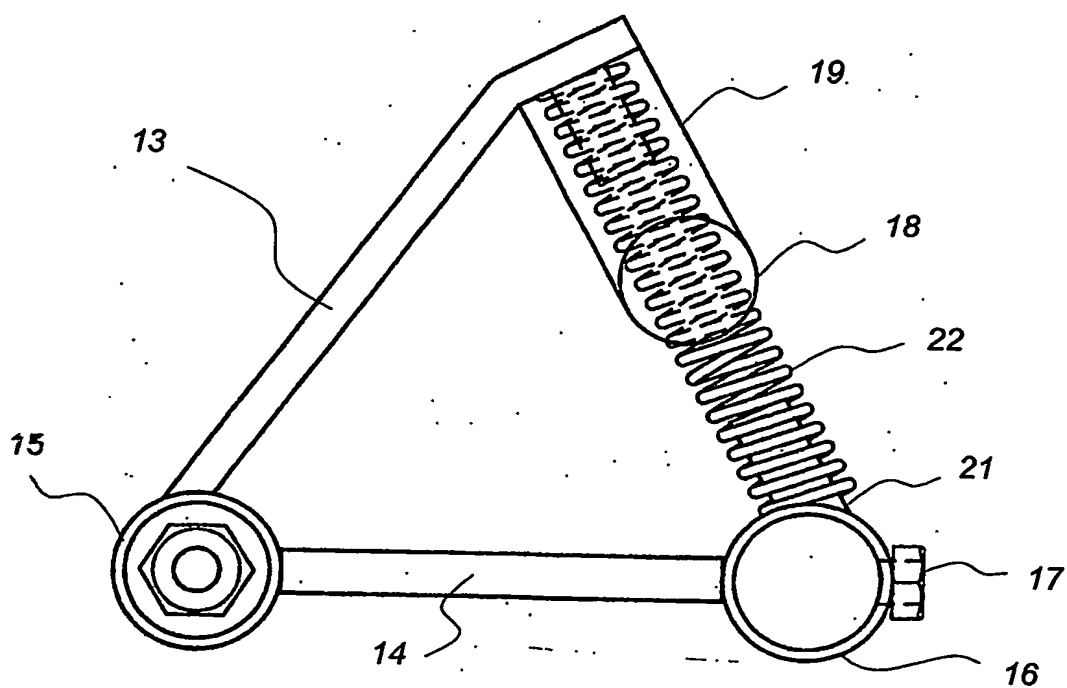
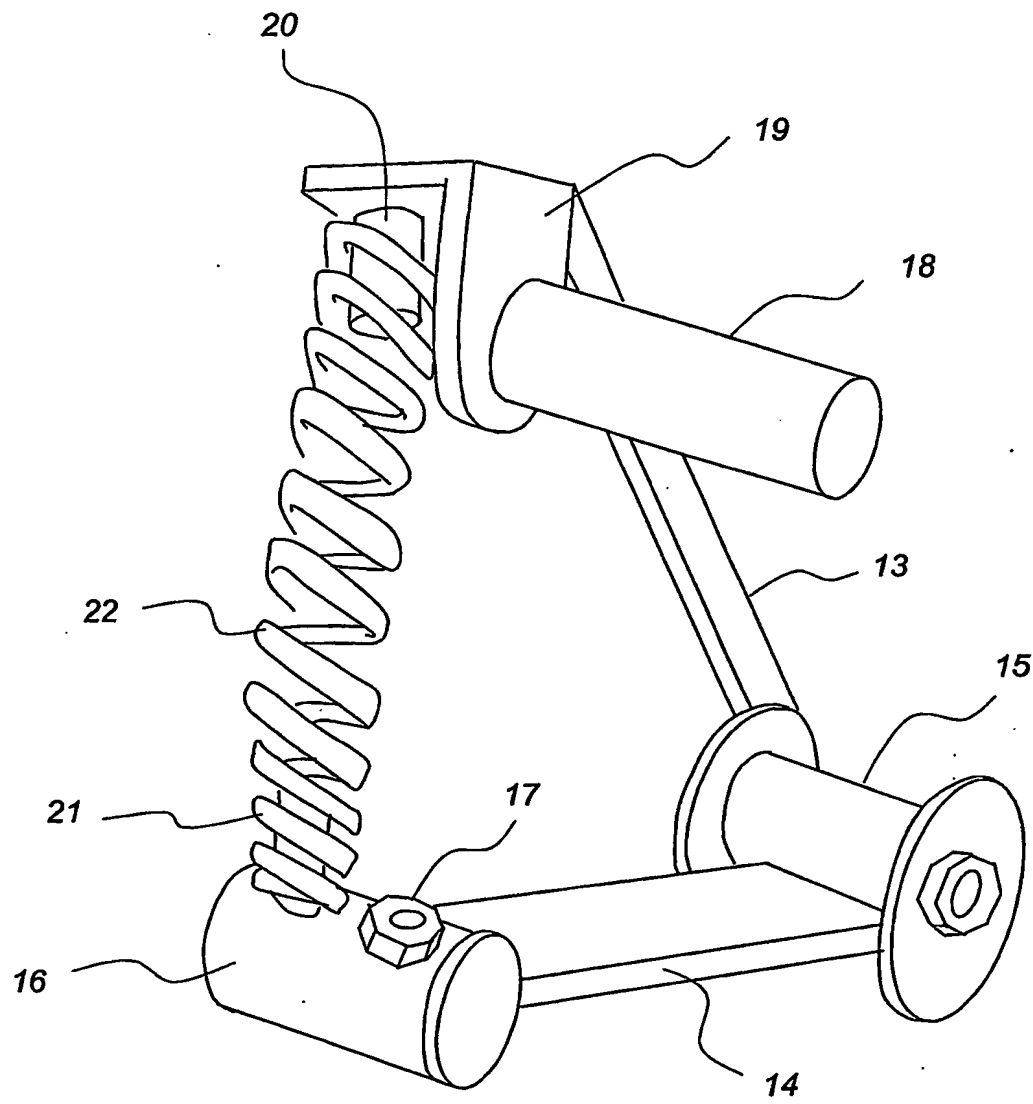


FIG. 3

**FIG. 4**

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ **BLACK BORDERS**
- ☒ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☒ **GRAY SCALE DOCUMENTS**
- ☒ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☒ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.